

IN THE SPECIFICATION

Please replace the paragraphs beginning at page 2, line 1, through page 3, line 8, with the following rewritten paragraphs:

More specifically, air leaf suspensions each comprising a leaf spring and an air spring in combination and arranged at opposite sides of a vehicle are advantageous in that only two air springs suffice for support of the axle and in that stabilizers may be omitted because of the leaf springs serving as stabilizers, leading to simplification of the whole structure. As a result, the air leaf suspensions are less expensive and have less increase in vehicle weight than conventional four-bag air suspensions each for supporting an axle by means of four air springs arranged forwards, ~~backwards~~ rearwards, left and right of the axle. Such kind of air leaf suspensions have been disclosed, for example, in the applicants' JP 2003-34113A.

Basic design concept not only in the above-mentioned air leaf suspensions but also in existing conventional suspensions resides in that periaxial rolling moments (braking and driving forces) and lateral displacement moments applied on the axle are positively suppressed to allow only vertical displacement of the axle. Improvement in vehicle-riding comfort on the basis of such design concept has, however, been limitative of itself.

Because, in order to improve vehicle-riding comfort of air leaf suspensions on the basis of such existing design concept, a leaf spring made of high-strength steel with toughness and with extremely reduced thickness is to be provided for each of the sides of a vehicle so as to attain low spring constant while air springs are to be larger-sized to give added weight in effectiveness of the air springs; however, such lowered spring constant may lead to extremely lowered spring effect so that the chassis may tend to be readily rolled, resulting in a lowering of drivability.

Please replace the paragraphs beginning at page 3, line 15, through page 5, line 24, with the following rewritten paragraphs:

The present invention provides a suspension which comprises an axle hanged from a chassis side by resilient support means with different spring characteristics arranged forwards and ~~backwards~~ rearwards of the axle, said axle being allowed to roll due to difference in spring characteristics of the forward and ~~backward~~ rearward resilient support means.

Thus, due to the difference in spring ~~characteristic~~ characteristics between the forward and ~~backward~~ rearward resilient support means, the axle rolls upon receipt of vibrations from a road surface. This rolling motion of the axle absorbs vibration energy transmitted from the road surface to the chassis side so that ~~obtained is~~ an excellent road-surface vibration shielding effect is obtained which is competitive to those of the existing expensive four-bag air suspensions.

The vibration shielding effect obtained due to the rolling motion of the axle makes it unnecessary to attain a substantially lowered spring constant which might cause an extremely lowered spring effect. Moreover, the allowed rolling motion of the axle decreases relative vertical displacement of the axle itself so that prevented are the tendency of the chassis being rolled and resultant lowering of the drivability from occurring.

In embodying the invention, the forward resilient support means may be provided by a leaf spring which is fitted at its base end to the axle and extends forwards to form a bend convex forwards in the vehicle and is mounted at its tip to a chassis side; the ~~backward~~ rearward resilient support means may be provided by an air spring interposed between a bracket fitted to the axle and extending ~~backwards~~ rearwards and the chassis side above the bracket.

Thus provided forward resilient support means in the form of leaf spring has the readily deflecting bend which provides a resilient support with relatively low spring constant

at a position spaced forwards away from the axle while the thus provided backward rearward resilient support means has the air spring which provides a backward rearward resilient support at a position backwards rearwardly away from the axle and having a spring constant lower than that of the bend of the forward resilient support. Due to the difference in spring characteristic characteristics between the forward and backward rearward resilient supports respectively provided by the leaf and air springs, the axle rolls upon receipt of vibrations from the road surface. This rolling motion of the axle absorbs the vibration energy through which the vibrations from the road surface are transmitted to the chassis side so that obtained is an excellent road-surface vibration shielding is obtained which is effect competitive to those of the existing expensive four-bag air suspensions.

The Spring spring constant of the bend of the leaf spring must be relatively low for harmony with that of the backward rearward air spring[[;]]. however However, the vibration shielding effect obtained due to the rolling motion of the axle makes it unnecessary to attain a substantially lowered spring constant which might cause an extremely lowered spring effect. Moreover, the allowed rolling motion of the axle decreases relative vertical displacement of the axle itself so that prevented are the tendency of the chassis being rolled and resultant lowering of the drivability are prevented from occurring.

On page 6, between lines 5 and 6, please insert the following paragraph:

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Please replace the paragraphs beginning at page 6, line 17, through page 7, line 21, with the following rewritten paragraphs:

Figs. 1 to 4 show an embodiment of the invention. As shown in Figs. 1 and 2, in a suspension according to the embodiment, an axle 1 is hanged from each of opposite side rails 4 by means of a leaf spring 2 forwards in the vehicle (left in Figs. 1 and 2) and an air spring 3 backwards rearwards in the vehicle (right in Figs. 1 and 2). Thus, the leaf and air springs 2 and 3 provide forward and backward rearward resilient support means, respectively.

On both sides of the vehicle, the forward leaf spring 2 is fitted at its base end to an upper surface of an end of the axle 1 and extends forwards in the vehicle and has its tip eye 6 movably fitted over a horizontal pin 8 of a bracket 7 on an outer side surface of each of the side rails 4, the leaf spring 2 having a forward portion which provides a bend 9 protruding forwards and downwards of the eye 6 and turning backwards rearwards and upwards in the vehicle in the form of letter J.

On the both sides of the vehicle, a bracket 10 is fitted to a lower surface of the end of the axle 1 and extends backwards rearwards in the vehicle. The bracket 10 is bent at its backward rearward portion laterally inwardly to be positioned just below each of the side rails 4 (see Fig. 2), an air spring 3 being interposed between this portion of the bracket 10 and the side rail 4.

Please replace the paragraph beginning at page 7, line 22, through page 8, line 20, with the following rewritten paragraph:

A pair of upper rods 12 (suspension links) are arranged on inner sides of the opposite side rails 4 forwards of the axle 1 and extend backwards rearwards convergently in the vehicle to be connected via brackets 13 to a central upper surface of the axle 1. Thus, only the upper portion of the axle 1 is locked longitudinally of the vehicle so that, due to the

difference in spring characteristic between the leaf and air springs 2 and 3, the axle 1 is allowed to roll about the center PC at which the upper rods 12 are connected to the axle 1 via the brackets 13.

Adoption of the illustrated upper rods 12 which extend ~~backwards~~ rearwards and convergently makes it possible to cope with forces inputted both longitudinally and laterally of the vehicle[[],]. ~~alternatively~~Alternatively, parallel-link type upper rods may be adopted with separate parallel lateral rods being used for force inputted laterally. In the figures, reference numeral 14 denotes tires.

With the suspension thus constructed as mentioned above, the forward resilient support means in the form of leaf spring 2 has the readily deflecting bend 9 which provides a resilient support with relatively low spring constant at a position spaced forwards away from the axle 1 while the ~~backward~~ rearward resilient support means has the air spring 3 which provides a ~~backward~~ rearward resilient support at a position backwardly separated away by the bracket 10 from the axle 1 and having spring constant lower than that of the bend 9 of the forward resilient support. Due to the difference in spring characteristic between the forward and ~~backward~~ rearward resilient supports respectively provided by the leaf and air springs 2 and 3, the axle 1 rolls about the center P_c upon receipt of vibrations from the road surface. This rolling motion of the axle 1 consume the vibration energy from the road surface as the rolling-vibration energy of the axle 1 so that ~~obtained~~ is an excellent road-surface vibration shielding effect is obtained which is competitive to those of the existing expensive four-bag air suspensions.

The spring constant of the bend 9 of the leaf spring 2 must be relatively low in view of harmony with that of the ~~backward~~ rearward air spring 3; however, the excellent vibration shielding effect obtained due to the rolling motion of the axle 1 makes it unnecessary to attain substantially lowered spring constant which might cause extremely lowered spring effect.

Moreover, the allowed rolling motion of the axle 1 decreases relative vertical displacement of the axle itself so that ~~prevented~~ are the tendency of the chassis being rolled and the resultant lowering of the drivability are prevented from occurring.

Please replace the paragraph beginning at page 9, line 10 through page 10, line 13 with the following rewritten paragraph:

The spring constant of the bend 9 of the leaf spring 2 much be relatively low in view of harmony with that of the ~~backward~~ rearward air spring 3; however, the excellent vibration shielding effect obtained due to the rolling motion of the axle 1 makes it unnecessary to attain substantially lowered spring constant which might cause extremely lowered spring effect. Moreover, the allowed rolling motion of the axle 1 decreases relataive vertical displacement of the axle itself so that ~~prevented~~ are the tendency of the chassis being rolled and the resultant lowering of the drivability are prevented from occurring.

Fig. 3 shows a model from the above-mentioned suspension shown in Figs. 1 and 2.

M_s : upper mass of spring (mass of chassis side)

M_u : lower mass of spring (mass of suspension side)

I_u : rolling moment of inertia

K_T : spring constant of tire

K_L : Spring constant of leaf spring

K_a : spring constant of air spring

C_a : spring constant of shock absorber

l_L : distance from center of rolling motion of axle to the forward resilient support

l_a : distance from center of rolling motion of axle to the ~~backward~~ rearward resilient support

Z_T : displacement of tire side from a balanced position

Z_S : displacement of supper rigid body (chassis) side of spring from a balanced position

Z_u : displacement degree of lower rigid body (suspension) side of spring from a balanced position

Please replace the paragraph beginning at page 10, line 23 through page 11, line 5, with the following rewritten paragraph:

These three simultaneous equations of motion are solved to obtain results as plotted in the diagram of Fig. 4. In this diagram, vibration frequency is plotted ~~in~~ on the abscissa and vibration level is plotted ~~in~~ on the ordinate; and curves in solid and chain lines show the cases where the axle 1 is not allowed to make rolling motion and where the axle 1 is allowed to make rolling motion, respectively.

Please replace the paragraphs beginning at page 11, line 13, through page 12, line 10, with the following rewritten paragraphs:

Therefore, in the above-mentioned embodiment which adopts, without adhering to the existing design concept, a novel design concept which allows rolling motion of the axle 1, the rolling motion of the axle 1 is positively caused due to the difference in spring characteristic between the leaf and air springs 2 and 3. This rolling motion of the axle 1 consumes the vibration energy from the road surface as rolling-vibration energy of the axle 1 and can decrease vibrations transmitted to the chassis, leading to attaining an excellent vehicle-riding comfort competitive to those in the existing four-bag air suspensions without extreme lowering of spring constant and averting lowering of the drivability. Moreover, the combination of the leaf and air springs 2 and 3 brings about lightness in weight and inexpensiveness in cost in comparison with the existing four-bag air suspensions.

It is to be understood that the present invention is not limited to the embodiment described above and that various changes and modifications may be made without departing from the spirit of the invention. For example, the resilient support means forwards and

backwards rearwards of the axle are not limited to the illustrated combination of the leaf and air springs.

Please amend the Abstract at page 14, lines 1-11, as follows: